

REMARKS

As an initial matter, Applicant appreciates the Examiner's reconsideration and withdrawal of all of the claim rejection included in the Office Action dated February 8, 2006.

During a telephone conversation on January 23, 2007, the Examiner agreed to reconsider this application upon the filing of this Request for Reconsideration and a copy of an English-language translation of JP-A 2002-370940 ("JP '940"). Applicant appreciates the Examiner's willingness to reconsider this application in light of the English-language translation of JP '940, which has been attached hereto. For at least the reasons outlined herein, Applicant respectfully submits that pending claims 1-33, 35, 37, and 42 are patentably distinguishable from JP '940.

I. Acknowledgement of Withdrawn Claims

Applicant acknowledges the withdrawal of claims 38-40 and 43 in response to Applicant's election without traverse of claims 1-25, 31, 32, 35, 37, and 42 in the Response to Office Action filed August 8, 2006. Claims 26-30 and 33 were previously withdrawn as being directed to non-elected species, and claims 34, 36, and 41 have been previously canceled. Thus, claims 1-25, 31, 32, 35, 37, and 42 have been examined on the merits.

II. Claim Rejection under 35 U.S.C. § 102(b) based on JP '940

In the final Office Action, claims 1, 19, 21, 25, and 42 were rejected under 35 U.S.C. § 102(b) based on JP '940. Of those claims, only claim 1 is an independent claim. Applicant respectfully traverses the rejection of independent claim 1 under § 102(b) based on the JP '940 reference because that reference does not disclose or suggest all of the subject matter recited in independent claim 1.

Applicant's independent claim 1 recites a device for packaging and dispensing a cosmetic product including, among other recitations, "at least one body comprising a binder, and a plurality of particles associated with the binder" The JP '940 reference does not disclose or suggest at least that subject matter recited in independent claim 1.

In the final Office Action, the rejection statement asserts that JP '940 discloses "a device for packaging and dispensing a cosmetic product comprised of a receptacle 4 containing a cosmetic product and a body comprised of a binder 3 and a plurality of particles 1 associated with the binder wherein the body defines a cavity visible to the naked eye. . . ." Final Office Action at 2.

Applicant respectfully traverses the § 102(b) rejection based on JP '940. Referring to the English-language translation of JP '940, contrary to the rejection statement's assertion about what JP '940 discloses, JP '940 does not disclose a binder 3 and a plurality of particles 1 associated with the binder 3. Rather, according to the English-language translation, the JP '940 reference discloses improving a chemical solution for cosmetic treatment 2 by providing an improving material in particle or other

form in a chemical solution for cosmetic treatment 2. (See page 10, paragraph [0024].)

The improving material 1 in particle or other form may be directly placed in the chemical solution for cosmetic treatment 2, as shown in Fig. 1(a). Id. Additionally, it is possible to house the improving material 1 in a **small cage 3** having an appropriate liquid-permeable structure, as shown in Fig. 2(a), and to immerse the cage 3 in the chemical solution for cosmetic treatment 2, as shown in Fig. 2 (b). Id. (emphasis added). The JP '940 reference also discloses another embodiment in which a stirring rod 5 is attached to the cage 3, as shown in Fig. 3(a), which can be used to stir the cage 3 in the chemical solution for cosmetic treatment 2. Id.

Thus, what the rejection statement appears to equate with Applicant's recited "binder," is actually disclosed as being a cage rather than a binder, according to the English-language translation of JP '940. Therefore, the JP '940 reference does not disclose "a body comprised of a binder 3 and a plurality of particles 1 associated with the binder [3]," as asserted by the rejection statement. For at least this reason, Applicant respectfully submits that JP '940 does not disclose or suggest all of the subject matter recited in Applicant's independent claim 1, and thus, independent claim 1 is patentably distinguishable from JP '940.

III. Claim Rejection under 35 U.S.C. § 103(a) based on JP '940

Claims 2-18, 20, 22-24, 31, 32, 35, and 37 were rejected under 35 U.S.C. § 103(a) based on JP '940. Each of claims 2-18, 20, 22-24, 31, 32, 35, and 37 depends from allowable independent claim 1. For at least the same reasons that independent

claim 1 is patentably distinguishable from JP '940, dependent claims 2-18, 20, 22-24, 31, 32, 35, and 37 are patentably distinguishable from JP '940.

IV. Conclusion

For at least the reasons set forth above, independent claim 1 should be allowable. Dependent claims 2-25, 31, 32, 35, 37, and 42 depend from independent claim 1. Therefore, those dependent claims should be allowable for at least the same reasons independent claim 1 is allowable. Further, previously withdrawn claims 26-30 and 33 depend from allowable independent claim 1. Therefore, Applicant respectfully requests rejoinder, examination, and allowance of claims 26-30 and 33.

Applicant respectfully requests reconsideration of this application, withdrawal of the outstanding claim rejections, and allowance of claims 1-33, 35, 37, and 42.

If the Examiner believes that a telephone conversation might advance prosecution, the Examiner is cordially invited to call Applicant's undersigned attorney at (571) 203-2739.

Applicant respectfully submits that the final Office Action contains a number of assertions concerning to the related art and the claims. Regardless of whether those assertions are addressed specifically herein, Applicant declines to automatically subscribe to those assertions.

Please grant any extensions of time required to enter this response and charge
any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: February 5, 2007

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Attachment: English-language translation of JP-A 2002-370940

**JAPANESE PATENT APPLICATION,
FIRST PUBLICATION № 2002-370940**

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TITLE	Method of Improving Chemical Solution for Cosmetic Treatment of Hair
APPLICATION №	2001-180193
FILING DATE	14 June 2001
APPLICANT(S)	NIHON EPOQUE CO., LTD.
INVENTOR(S)	Masao YOKOZEKI, Junichi EUZUKI, Noriko NAKATA and Atsuko MUKAI

ABSTRACT

SOLUTION To offer an improved chemical solution for the cosmetic treatment of hair capable of performing cosmetic treatments such as cold permanents, hair dyeing, hair bleaching and straight permanents in a shorter time than conventional while preventing damage to the hair or skin problems due to the chemical solution, and improving materials and improving tools therefor.

EFFECTS A method of improving a chemical solution for cosmetic treatment of hair by contacting with a pyroelectric substance or a pyroelectric substance and a specific metal ion, and improving materials and improving tools comprising a pyroelectric substance or a pyroelectric substance and a specific metal ion therefor.

CLAIMS

1. A method of improving a chemical solution for cosmetic treatment of hair, characterized by contacting the chemical solution for cosmetic treatment of hair with a pyroelectric substance.
2. An improving method as recited in claim 1, wherein the chemical solution for cosmetic treatment of hair is a cold permanent solution, a hair dyeing solution, a hair bleaching solution or a straight permanent solution.
3. An improving method as recited in claim 1 or 2, wherein the chemical solution for cosmetic treatment of hair is stirred with a material containing a pyroelectric substance present in the chemical.
4. An improving method as recited in claim 3, wherein the material containing a pyroelectric substance is in the form of a powder, granules, or other form containing pyroelectric substances.
5. An improving method as recited in claim 4, wherein the material containing a pyroelectric substance contains at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt.
6. An improved chemical solution for cosmetic treatment of hair, obtained by an improving method as recited in any one of claims 1-5.
7. An improved chemical solution for cosmetic treatment of hair as recited in claim 6, wherein the improved chemical solution for cosmetic treatment of hair is an improved cold permanent solution, hair dyeing solution, hair bleaching solution or straight permanent solution.
8. An improving material for a chemical solution for cosmetic treatment of hair, characterized by consisting of a material comprising a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt.

9. An improving material as recited in claim 8, which is an improving material for a cold permanent solution, a hair dyeing solution, a hair bleaching solution or a straight permanent solution.
10. An improving material as recited in claim 8 or 9, in the form of a powder, granules, or other form.
11. An improving tool for a chemical solution for cosmetic treatment of hair, wherein an improving material in the form of granules or other form comprising a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt is sealed inside a liquid-permeable cage.
12. A receptacle for a chemical solution for cosmetic treatment of hair, characterized by receiving an improving material as recited in any one of claims 8-10 or an improving tool as recited in claim 11.
13. A fiber product for cosmetic treatment of hair, having as a base a fabric formed using fibers containing or having adhered a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt.
14. A fiber product as recited in claim 13, which is a sheet or cap used for application of a cold permanent, hair dyeing, hair bleaching or straight permanent.
15. A cosmetic treatment method for hair, characterized by performing a cosmetic treatment of hair by using an improved chemical solution for cosmetic treatment of hair as recited in claim 6 or 7.
16. A cosmetic treatment method for hair, characterized by performing a cosmetic treatment of hair by using an improved chemical solution for cosmetic treatment of hair as recited in claim 6 or 7, and a fiber product as recited in claim 13 or 14.

DETAILED DESCRIPTION OF THE INVENTION

[0001]

TECHNICAL FIELD OF THE INVENTION

The present invention relates to a method of improving a chemical solution used in a cosmetic treatment of hair such as cold permanents, hair dyeing, hair bleaching and straight permanents, a chemical solution for use in cosmetic treatment of hair obtained by said improvement method, an improving material for said chemical solution, a fiber product such as a fabric sheet or cap for smoothly performing the cosmetic treatment, and a method of cosmetically treating hair using these. According to the present invention, it is possible to perform cosmetic treatments such as cold permanents, hair dyeing, hair bleaching and straight permanents in a shorter time than with conventional methods, while preventing or reducing damage to the hair and skin problems due to the chemical solution. Furthermore, according to the present invention, it is possible to treat even hair that was conventionally difficult to subject to cold permanents or hair dyeing due to the excessive damage, smoothly in a short time.

[0002]

CONVENTIONAL ART

Cold wave lotions (cold permanent solution) used in cold permanents to cause the hair to curl or wave is usually composed of a solution (first solution) containing a reducing agent such as thioglycolic acid and a solution (second solution) containing an oxidizing agent such as sodium bromate or hydrogen peroxide. When applying a cold permanent to hair, generally, (i) the hair is wound onto hair curlers or the like, then a first solution is applied, (ii) the hair is wrapped in a towel and a cap is worn, then the head is covered by a heater (accelerator) and heated for at least 10 minutes, (iii) the cap and towel are removed and the curling state checked, then the second solution is applied with the hair curlers still in place, (iv) the hair is once again wrapped in a towel and re-covered by a cap, then the head is covered by an accelerator to heat for at least 10 minutes, and finally (v) the hair curlers are removed and the hair washed.

[0003]

Additionally, straight permanents are treatments for straightening hair that has curls or waves, usually using the same solutions as the cold permanent solutions. When performing hair straightening, generally, (i) a first solution is applied to the hair, (ii) the hair is wrapped in a towel and covered with a cap, then the head is covered by an accelerator and heated for 10 minutes, (iii) the cap and towel are removed and the softness of the hair is checked, then the first solution is scraped off with a comb, (iv) an iron at about 160 °C is applied, (v) the second solution is applied and the hair is straightened with a comb, then the hair is wrapped in a towel, and the head is covered with an accelerator and heated for at least 10 minutes, and finally (vi) the towel is removed and the hair washed.

[0004]

Furthermore, hair dyeing is nowadays usually performed using a synthetic dyeing agent, the synthetic dyeing agent usually consisting of a first solution containing a dye intermediary and a second solution such as an oxidizing agent for causing the dye intermediary to generate color. When dyeing the hair, generally, (i) the first solution and second solution are mixed, then the mixed solution is applied to the hair, (ii) the hair is wrapped in a towel, then covered with a cap,

and the head is covered by an accelerator and heated for at least 20 minutes, (iii) the cap and towel are removed to check the color, then combed through, (iv) the cap is applied again and the head re-covered by the accelerator and heated for at least 10 minutes, and finally, (v) the towel is removed and the hair washed.

[0005]

As is clear from the above explanation, conventional cosmetic treatments for hair using chemical solutions such as cold permanents, straight permanents, and hair dyeing require a long time for the treatment, are difficult to perform in a short time, and in particular, straight permanent treatments require a very long time and skillful techniques. Moreover, expensive heaters (accelerators) are needed to activate the functions of the chemical solution for cosmetic treatment. For this reason, the labor conditions of the person applying the treatment are worsened, and the person receiving the treatment (customer) can become tired, thus reducing the business efficiency due to drops in customer turnover and raising equipment expenditures. IN the case of straight permanents, there are some beauty salons that do not put this on the menu. Additionally, conventional cold permanent solutions and hair dyes can do great damage to the hair, thus requiring hair care after treatment. Additionally, when treatment solutions such as cold permanent solution or hair dye adheres to the scalp, face or hands, this can cause skin problems in some people, and furthermore, the odor of the chemical solution can be unpleasant, they can suffer in terms of safety and sanitation, and also degrade the treatment environment. Furthermore, conventional cold permanent solutions and hair dyes are not very effective against highly damaged hair having a straw shape, making it difficult to apply permanents, and not possible to satisfactorily apply hair dyes. Additionally, conventional cold permanent solutions are all highly irritant, and greatly affect the hair and skin, thus making it difficult to apply a cold permanent and a hair dye simultaneously, and forcing the cold permanent and hair dye to be performed on different days. Additionally, conventional hair dyes can be difficult to remove when adhering to the skin, thus requiring special solvents or coarse rubbing in order to remove it from the skin.

[0006]

PROBLEMS TO BE SOLVED BY THE INVENTION

A purpose of the present invention is to offer a chemical solution for cosmetic treatments capable of performing cosmetic treatment of hair using chemical solutions such as cold permanents, straight permanents, hair dyeing and hair bleaching without using expensive equipment such as heaters (accelerators) and in a shorter time than in the past. A further purpose of the present invention is to offer an improved technique of reducing damage to the hair and not requiring any special hair care after treatment in applying cosmetic treatments to the hair such as cold permanents, straight permanents, hair dyeing and hair bleaching. An additional purpose of the present invention is to offer a chemical solution for use in cosmetic treatments of hair, having few skin problems even when adhering to the scalp, face and hands, and excelling in safety. Another purpose of the present invention is to offer a chemical solution for cosmetic treatment of hair, that does not have an unpleasant odor, and does not invite degradation of the treatment environment: decreases in terms of sanitation. A further purpose of the present invention is to offer a hair dye solution that is easier to remove than conventional hair dye solutions upon adhering to the skin. A further purpose of the present invention is to offer a chemical solution for use in cosmetic treatment of hair, a treatment tool and a treatment technique capable of applying cold permanents, straight permanents, and hair dyes even to highly damaged, straw-form hair, capable of performing a cold permanent and

hair dyeing simultaneously, and capable of leaving the hair firm after treatment.

[0007]

MEANS FOR SOLVING THE PROBLEM

The present inventors performed diligent research toward achieving the above purpose. As a result, they discovered that by treating conventional commercially available chemical solutions for cosmetic treatments used for cold permanents, straight permanents, hair dyeing and hair bleaching with materials containing pyroelectric substances, or materials containing a pyroelectric substance and at least one type of metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt, the chemical solutions for cosmetic treatments can be improved, the unpleasant odor of the chemical solution being eliminated, and by performing treatments such as cold permanents, straight permanents, hair dyeing and hair bleaching using such improved chemical solutions, the treatments can be performed well in a much shorter time than in the past without the need to use expensive equipment such as heaters (accelerators), the hair after the treatment is left in a firm condition, and skin problems due to the chemical solutions are reduced. Furthermore, they discovered that the aforementioned improved hair dye solution is easily removed even upon adhering to the skin, and when an improved cold permanent solution and hair dye solution are used together, cold permanents, straight permanents and hair dyeing can be performed with respect to highly damaged, straw-form hair, and a cold permanent or straight permanent can be performed simultaneously with hair dyeing. Additionally, the present inventors discovered that in that case, the chemical solutions for cosmetic treatment can be improved by a simple operation of putting an improving material consisting of a pyroelectric substance or a pyroelectric substance and a metal ion such as described above in the form of a powder, granules or other shape, placing it inside the chemical solution for cosmetic treatment, then stirring the chemical solution for cosmetic treatment.

[0008]

Furthermore, the present inventors discovered that by forming fiber products such as towels for wrapping the hair and caps for covering the hair that are normally used when performing cosmetic treatments of the hair such as cold permanents, straight permanents, hair dyeing and hair bleaching out of fiber fabrics containing or having adhered thereto pyroelectric substances or pyroelectric substances and at least one type of metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt, and using these towels and/or caps to perform the aforementioned cosmetic treatments, the aforementioned effects of the chemical solutions for cosmetic treatment improved by the pyroelectric substances or pyroelectric substances and metal ions are promoted even more, so that the cosmetic treatments can be performed more smoothly in a short time, the hair after treatment is left in a good, firm condition, skin problems due to the chemical solutions are reduced, the permanents and hair dyeing can be performed simultaneously, and permanents and hair dyeing can be more easily applied to highly damaged, straw-form hair.

[0009]

In other words, the present invention is (1) a method of improving a chemical solution for cosmetic treatment of hair, characterized by contacting the chemical solution for cosmetic treatment of hair with a pyroelectric substance. Additionally, the present invention is (2) an improving method as in (1), wherein the chemical solution for cosmetic treatment of hair is a cold permanent solution, a hair dyeing solution, a hair bleaching solution or a straight

permanent solution; (3) an improving method as in (1) or (2) wherein the chemical solution for cosmetic treatment of hair is stirred with a material containing a pyroelectric substance present in the chemical; (4) an improving method as in (3) wherein the material containing a pyroelectric substance is in the form of a powder, granules, or other form containing pyroelectric substances; and (5) an improving method as in (4), wherein the material containing a pyroelectric substance contains at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt.

[0010]

Furthermore, the present invention is (6) an improved chemical solution for cosmetic treatment of hair, obtained by an improving method as in any one (1)-(5); and (7) an improved chemical solution for cosmetic treatment of hair as in (6), wherein the improved chemical solution for cosmetic treatment of hair is an improved cold permanent solution, hair dyeing solution, hair bleaching solution or straight permanent solution.

[0011]

Additionally, the present invention is (8) an improving material for a chemical solution for cosmetic treatment of hair, characterized by consisting of a material comprising a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt; (9) an improving material as in (8), which is an improving material for a cold permanent solution, a hair dyeing solution, a hair bleaching solution or a straight permanent solution; and (10) an improving material as in (8) or (9), in the form of a powder, granules, or other form.

[0012]

Furthermore, the present invention is (11) an improving tool for a chemical solution for cosmetic treatment of hair, wherein an improving material in the form of granules or other form comprising a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt is sealed inside a liquid-permeable cage; and (12) a receptacle for a chemical solution for cosmetic treatment of hair, characterized by receiving an improving material as in any one of (8)-(10) or an improving tool as in (11).

[0013]

Additionally, the present invention is (13) a fiber product for cosmetic treatment of hair, having as a base a fabric formed using fibers containing or having adhered a pyroelectric substance, or comprising a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt; and (14) a fiber product as in (13), which is a sheet or cap used for application of a cold permanent, hair dyeing, hair bleaching or straight permanent.

[0014]

Furthermore, the present invention is (15) a cosmetic treatment method for hair, characterized by performing a cosmetic treatment of hair by using an improved chemical solution for cosmetic treatment of hair as in (6) or (7); and (16) a cosmetic treatment method for hair, characterized by performing a cosmetic treatment of hair by using an improved chemical solution for cosmetic treatment of hair as in (6) or (7), and a fiber product as in (13) or (14).

[0015]

EMBODIMENTS OF THE INVENTION

We shall explain the present invention in detail below. The "pyroelectric substance" used in the present invention is a substance that exhibits pyroelectric properties. In the present invention, any pyroelectric substance may be used, and typical examples include pyroelectric minerals such as tourmaline and hemimorphite. Among these, tourmaline is most preferably used.

[0016]

In the present invention, the improvement of the chemical solution for cosmetic treatment of hair may be performed by using a pyroelectric substance alone, or by using a pyroelectric substance in combination with at least one type of metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt, among which it is preferable to use a pyroelectric substance in combination with at least one type of metal ion mentioned above, since this enables the present invention to provide superior effects.

[0017]

When using a pyroelectric substance in combination with a metal ion, the metal ions are preferably carried on inorganic particles. While any type of inorganic particle may be used to carry the metal ions as long as the inorganic particles are safe and sanitary, the inorganic particles should preferably have an ion exchange capability and a metal ion adsorption capability, and a high metal ion retention ability, and typical examples include inorganic particles having ion exchange capability such as zeolite, zirconium malate and calcium phosphate, among which zeolite is most preferable. The inorganic particles for retaining metal ions should preferably have an average particle size of 3 μm or less, more preferably 2 μm or less, and even more preferably 1 μm or less. Additionally, the inorganic particles should hold high concentrations of the above-described metal ions, and for example, if the inorganic particle is zeolite having ion exchange capability, then at least 90% of the ion exchange capacity should preferably be exchanged with metal ions, and if the metal ions are held by physical adsorption to the inorganic particles, then the metal ions should be adsorbed at a rate of at least 90% of saturation. When using metal ions, particularly metal ions held by inorganic particles as described above, in combination with the pyroelectric substance, the proportion of the metal ion-carrying inorganic particles should be set to 0.1-10 parts by weight with respect to 1 part by weight of the pyroelectric substance.

[0018]

The "chemical solution for cosmetic treatment of hair" according to the present invention may be any chemical that is used to cosmetically treat the hair, typical examples including cold permanent solution, hair dyeing solution, hair bleaching solution and straight permanent solution. The type, composition and manufacturer of the chemical solution for cosmetic treatment such as cold permanent solution, hair dyeing solution, hair bleaching solution and straight permanent solution used in the improving method of the present invention are not restricted in any way, and the improving technique of the present invention is effective for any conventional commercially available chemical solution for cosmetic treatment. In particular, the improving technique of the present invention has a considerable improving effect on chemicals for cosmetic treatments of intermediate grade or less that are sold at low prices, and

is able to improve the quality of such chemicals for cosmetic treatments to have greater quality than chemicals for cosmetic treatment that have conventionally been treated as high-grade products.

[0019]

In the present invention, a chemical solution for cosmetic treatment of hair is improved by bringing the chemical solution for cosmetic treatment into contact with a pyroelectric substance, or a pyroelectric substance and at least one type of metal ion described above. Here, "bringing the chemical solution for cosmetic treatment into contact with a pyroelectric substance, or a pyroelectric substance and at least one type of metal ion" may be any action whereby the chemical solution for cosmetic treatment of hair is brought into direct contact with a pyroelectric substance or a pyroelectric substance and a metal ion in some form, and the form of contact is not particularly restricted. Typical examples of methods for containing a chemical solution for cosmetic treatment with a pyroelectric substance or a pyroelectric substance and a metal ion include:

- (a) a method of directly adding a powder of a pyroelectric substance or a powder of a pyroelectric substance and metal ions (e.g. inorganic particles carrying metal ions) as an improving material to a chemical solution for cosmetic treatment;
- (b) a method of providing an improving material consisting of particles or otherwise-shaped bodies formed from a pyroelectric substance or a pyroelectric substance and metal ions (e.g. inorganic particles carrying metal ions) in a chemical solution for cosmetic treatment;
- (c) a method of using stirring means formed using a pyroelectric substance or a pyroelectric substance and metal ions (e.g. inorganic particles carrying metal ions) as an improving material, and stirring the chemical solution for cosmetic treatment using said stirring means; and
- (d) a method of forming a container having a pyroelectric substance or a pyroelectric substance and metal ions on at least the surface thereof, and storing the chemical solution for cosmetic treatment inside this container.

According to the present invention, it is possible to employ any of the above-described methods (a)-(d).

[0020]

Among these, the methods of (b) and (c) described above are preferably used due to the fact that they enable the improving technique of the present invention to be directly applied to conventional commercially available chemicals for cosmetic treatment; particles, otherwise-shaped bodies or stirring means formed from a pyroelectric substance or a pyroelectric substance and metal ions (e.g. inorganic particles carrying metal ions) which have been used in an improving process can be repeatedly reused and are thus economical; and particles, otherwise-shaped bodies or stirring means formed from a pyroelectric substance or a pyroelectric substance and metal ions (e.g. inorganic particles carrying metal ions) are convenient to handle.

[0021]

Examples of improving materials for the above-mentioned particles, otherwise-shaped bodies and stirring means used for improving chemical for cosmetic treatment of hair according to the above methods (b) and (c) include powders of pyroelectric substances or powders of pyroelectric substances and inorganic particles carrying metal ions formed by using binders into spheres (balls), otherwise-shaped (cubes, short cylinders, short tubes) particles, rods, tubes or strips. The invention is not, however, limited to these forms. Examples of binders used to

form the improving material into spheres or other shapes include various polymers (e.g. polytetrafluoroethylene and other fluorine resins, naphthalene polymers, polyesters, polyamides, styrene polymers and acrylic polymers). Among these, inorganic materials such as alumina, silica and glass are most preferably used.

[0022]

The method of producing particles or otherwise-shaped bodies from a powder of a pyroelectric substance or a powder of a pyroelectric substance and inorganic particles carrying metal ions using a binder is not particularly restricted, and, for example, may involve adding an inorganic material powder or polymer as a binder to a powder of a pyroelectric substance or a powder of a pyroelectric substance and inorganic particles carrying metal ions, heating, sintering or fusing to form granules or perform molding. The proportion of the binders used in this case is not particularly restricted, and may be adjusted in accordance with the type of binder, but it is preferable to produce an improving material consisting of particles or otherwise-shaped bodies using a binder at a proportion of about 2-10 parts by weight, especially 2-5 parts by weight, with respect to one part by weight of pyroelectric substance powder, because this results in a high improving action against chemicals for cosmetic treatment of hair, and provides the improving material itself with high dynamic strength, making it difficult to destroy.

[0023]

In particular, improving materials wherein a binder is used to form a powder of a pyroelectric substance or a powder of a pyroelectric substance and inorganic particles carrying metal ions into spheres with a diameter of 1-10 mm, preferably spheres with a diameter of 1-5 mm, are preferable because the large surface area raises the contact efficiency with the chemical solution for cosmetic treatment, thus raising the improving effect on the chemical solution for cosmetic treatment, they are easy to produce, and are easy to handle.

[0024]

When improving a chemical solution for cosmetic treatment by providing an improving material in particle or other form in a chemical solution for cosmetic treatment, the improving material 1 in particle or other form may be directly placed in the chemical solution for cosmetic treatment as shown in Fig. 1(a). Additionally, it is possible to house the improving material 1 in a small cage 3 having an appropriate liquid-permeable structure as shown in Fig. 2(a), and to immerse the cage in the chemical solution for cosmetic treatment 2 as shown in Fig. 2(b). In the case of the embodiments shown in Figs. 1 and 2, it is preferable to place the improving material 1 or the cage 3 housing the improving material 1 in the chemical solution for cosmetic treatment, and then to stir the chemical solution for cosmetic treatment, since this allows for adequate improvement of the chemical 2 for cosmetic treatment. In this case, the reason is unclear, but the improvement effect is greater if stirred to the left. Additionally, it is possible to attach a stirring rod 5 to the aforementioned cage 3 to form a stirrer 6 as shown in Fig. 3(a), inserting the stirrer 6 into the chemical solution for cosmetic treatment, and stirring the chemical solution for cosmetic treatment 2 with the stirrer 6 (preferably stirring to the left) as shown in Fig. 3(b) to bring the chemical 2 into contact with the improving material 1. With the embodiments of Figs. 2 and 3 in which the improving material 1 is housed in the cage 3, it is easily possible to insert the improving material 1 into the chemical solution for cosmetic treatment, and to remove the improving material 1 from the chemical solution for cosmetic treatment 2 or the chemical container 4. The form and structure of the chemical container 4 are not particularly restricted, and it is possible to use containers that have been conventionally

used for chemicals for cosmetic treatment, such as the spray container shown in Fig. 1(b). An improving material 1 removed from the chemical solution for cosmetic treatment 2 or the chemical container 4 can be cleansed if needed, or repeatedly reused for improving the chemical solution for cosmetic treatment 2.

[0025]

The amount of the improving material (pyroelectric substance) to be placed in the chemical solution for cosmetic treatment can be adjusted according to the type and composition of the chemical solution for cosmetic treatment, and the characteristics of the hair of the person who is to undergo the cosmetic treatment. For example if the improving material consists of spheres of diameter 2-3 mm prepared using 3 parts by weight of a binder with respect to 1 part by weight of the pyroelectric substance 1, the chemical solution for cosmetic treatment can be adequately improved by placing about 5-20 (0.3-1.3 g) of the spheres for every 10 ml of the chemical solution for cosmetic treatment, and stirring for 5-180 seconds.

[0026]

By treating the hair with a chemical solution for cosmetic treatment improved as described above in accordance with the methods conventionally employed for treatments such as cold permanents, straight permanents, hair dyeing and hair bleaching in accordance with the type of chemical, it is possible to perform the respective treatments. In this case, when using a chemical solution for cosmetic treatment improved by the method of the present invention, the time required for the action of the chemical to take effect after treatment of the hair with the improved chemical solution for cosmetic treatment will be shortened, generally to less than half, as compared with conventional methods of treatment using conventional chemicals for cosmetic treatment not treated by the improving process of the present invention and aided by using heaters (accelerators), without the need to use expensive equipment such as heaters (accelerators).

[0027]

When performing a treatment such as a cold permanent, straight permanent, hair dyeing or hair bleaching using a chemical solution for cosmetic treatment improved according to the present invention, it is possible to use towels and caps that have been conventionally used as they were as towels for wrapping hair treated with the chemical solution at the time of treatment and caps for further covering the head, but by using fiber products such as towels and caps based on fabrics formed using fibers containing or having adhered thereto pyroelectric substances or pyroelectric substances and metal ions, the improvement effects due to use of chemical solutions for cosmetic treatments improved by pyroelectric substances or pyroelectric substances and metal ions are further promoted, thus enabling cosmetic treatments to be performed smoothly in a short time. Furthermore, the treated hair can be left in a good, firm condition, skin problems due to the chemical solution can be reduced, and permanents and hair dyes can be performed at the same time. Additionally, permanents and hair dyes can be performed at the same time on highly damaged, draw-form hair.

[0028]

The fabric used in the fiber product such as a towel (sheet) or cap used during the cosmetic treatment of hair may be any one of a non-woven fabric, a woven fabric, a knitted fabric, or a composite fabric using two or more of the above, as long as the fabric uses, in at least some of the fibers constituting the fabric, fibers containing or having adhered a pyroelectric substance or a pyroelectric substance and metal ions. Among these, non-woven fabrics are preferable for being able to provide adequate improving effects from the pyroelectric substance or pyroelectric substance and metal ions due to being able to make the fabric thick.

[0029]

The fibers composing the fabric forming the fiber product for cosmetic treatment such as a towel (sheet) or cap are not particularly restricted, and may be any fiber containing pyroelectric substances or pyroelectric substances and metal ions in the fiber or having them adhered on the fiber surface, including synthetic fibers, semi-synthetic fibers, artificial fibers, natural fibers, inorganic fibers, or fibers using a combination of two or more of the above. Examples of synthetic fibers include polyester fibers such as polyester terephthalate, polybutylene terephthalate and other polyesters; aliphatic polyamide fibers such as nylon 6, nylon 66, nylon 11, nylon 610 and nylon 612; alicyclic polyamide fibers; aromatic polyamide fibers formed using aromatic diamines and/or aromatic dicarboxylic acids or derivatives thereof (e.g. polyphenylene isophthalamide fibers, polyhexamethylene terephthalamide fibers, p-phenylene terephthalamide fibers and the like); polyolefin fibers such as polyethylenes and polypropylenes; fibers consisting of polyvinyl chloride polymers such as polyvinyl chloride, polyvinylchloride-vinyl acetate copolymers and vinyl chloride-acrylonitrile copolymers; fibers consisting of polyvinylidene chlorides such as polyvinylidene chloride, polyvinylidene chloride-vinyl chloride copolymers and vinylidene chloride-vinyl acetate copolymers; polyurethane fibers; acrylic fibers such as polyacrylonitrile and acrylonitrile-vinyl chloride copolymers; polyvinyl alcoholic fibers; polychlorals; fluorinated polymer fibers; protein-acrylonitrile copolymer fibers; polyglycolic fibers; and polyphenol resin fibers. Additionally, examples of semi-synthetic fibers include acetate fibers and examples of regenerated fibers include rayon and cupra. Additionally, examples of natural fibers include cotton, hemp, wool and silk. As examples of inorganic fibers, inorganic fibers such as glass fibers, carbon fibers and metal fibers can be used.

[0030]

The fibers forming the fabric product and the fabric formed from said fibers for use in cosmetic treatments according to the present invention are explained in detail along with their processes of manufacture in JP-A H8-325829, and in the present invention, the fibers and fabrics described in this publication are used to form fiber products such as the towel (sheet) and cap for the cosmetic treatment of the present invention.

[0031]

The method of performing the treatment such as cold permanent, straight permanent, hair dyeing or hair bleaching using the chemical solution for cosmetic treatment improved by the present invention is not particularly restricted, and can be performed in accordance with conventional treatment methods. For example, when performing a cold permanent, the improving material (such as the aforementioned spheres) of the present invention containing a pyroelectric substance or a pyroelectric substance and metal ions is placed in a dropper

container containing the first solution (an aqueous solution containing a reducing agent) of the cold permanent solution then stirred counterclockwise to form an improved first solution, which is applied to hair wound onto hair curlers or the like, then the hair is wrapped in a sheet (towel) consisting of a fabric formed from fibers containing a pyroelectric substance or a pyroelectric substance and metal ions, covered by a cap formed using a fabric formed from fibers containing a pyroelectric substance or a pyroelectric substance and metal ions, and further covered by a commercially available plastic cap. The hair is let stand for 5-7 minutes without covering the head with a heater (accelerator), at which stage the state of curling of the hair is tested, and if the state of curling is satisfactory, next the improving material (such as the aforementioned spheres) of the present invention containing a pyroelectric substance or a pyroelectric substance and metal ions is placed in a dropper container containing the second solution (an aqueous solution containing a reducing agent) of the cold permanent solution then stirred counterclockwise to form an improved second solution, which is applied to the hair, then the hair is again wrapped in a sheet (towel) consisting of a fabric formed from a fiber containing a pyroelectric substance or a pyroelectric substance and metal ions, re-covered by a cap formed using a fabric formed from fibers containing a pyroelectric substance or a pyroelectric substance and metal ions, and further re-covered by a commercially available plastic cap. The hair is let stand for 5-7 minutes without covering the head with a heater (accelerator), at which stage the state of curling of the hair is tested, then the cap, sheet and hair curlers are removed, the hair washed and dried.

[0032]

Additionally, when performing a straight permanent, for example, after washing the hair, the improving material (such as the aforementioned spheres) of the present invention containing a pyroelectric substance or a pyroelectric substance and metal ions is placed in a dropper container containing the first solution of the cold permanent solution then stirred counterclockwise to form an improved first solution, which is applied to the hair, then the hair is wrapped in a sheet (towel) consisting of a fabric formed from fibers containing a pyroelectric substance or a pyroelectric substance and metal ions, covered by a cap formed using a fabric formed from fibers containing a pyroelectric substance or a pyroelectric substance and metal ions, and further covered by a commercially available plastic cap. The hair is let stand for 5-7 minutes without covering the head with a heater (accelerator), at which stage the softness of the hair is tested, and upon reaching the desired softness, the first solution is scraped off the hair with a comb, then ironed at about 160 °C. Next, the improving material (such as the aforementioned spheres) of the present invention containing a pyroelectric substance or a pyroelectric substance and metal ions is placed in a dropper container containing the second solution (an aqueous solution containing a reducing agent) of the cold permanent solution then stirred counterclockwise to form an improved second solution, which is applied to the hair, then the hair is straightened using a comb, and in this state, wrapped in a sheet (towel) consisting of a fabric formed from a fiber containing a pyroelectric substance or a pyroelectric substance and metal ions. The hair is let stand for 5-7 minutes without covering the head with a heater (accelerator), then the sheet is removed, the hair washed and dried.

[0033]

Additionally, when dyeing hair, the improving material (such as the above-mentioned spheres) of the present invention containing pyroelectric substances or pyroelectric substances and metal ions are placed in a container with a first solution (solution containing dye intermediary) and a second solution (solution containing a coupler) and stirred counterclockwise to prepare an

improved mixed solution, which is applied to the hair. The hair is then wrapped in a sheet (towel) composed of a fabric formed from fibers containing pyroelectric substances or pyroelectric substances and metal ions, covered by a cap formed using a fabric formed from fibers containing pyroelectric substances or pyroelectric substances and metal ions, and further covered by a commercially available plastic cap. After letting stand for 3-5 minutes without covering the head with a heater (accelerator), the color of the hair is checked, then combed through. The hair is again wrapped in a sheet (towel) consisting of a fabric formed from fibers containing pyroelectric substances or pyroelectric substances and metal ions, and let stand for about 2-5 minutes without covering the head with a heater (accelerator), after which the sheet is removed, the hair washed and dried.

[0034]

EXAMPLES

While we shall describe the present invention in detail below by giving examples, the present invention is not to be construed as being restricted by any of these examples.

<< Example 1>> Production of Improving Material for Chemical Solution for Cosmetic Treatment of Hair

1 part by mass of a fine powder (average particle size 1 μm or less) of tourmaline (from Brazil), 0.3 parts by mass of a zeolite fine powder ion-exchanged by silver ions and zinc ions (Zeomic by Shinagawa Nenryō), and 3 parts by mass of alumina were baked at a temperature of 1000 °C or less to produce a spherical improving material with a diameter of about 3 mm.

[0035]

<< Example 2>> Cold Permanent Treatment

(1) (i) 15 spheres (about 1 g) of the improving material produced in Example 1 were put into a dropper container containing 40 ml of a first solution (aqueous solution containing a reducing agent) of a cold permanent solution (New Yamano Cold by Mutsunami), and manually stirred counterclockwise for 60 seconds using a rod to form an improved first solution. Three batches of the improved first solution were prepared for use by three subjects A (a 28 year old female), B (a 35 year old female) and C (a 48 year old female)

(ii) 15 spheres (about 1 g) of the improving material produced in Example 1 were put into a dropper container containing 40 ml of a second solution (solution containing an oxidizing agent) of the aforementioned cold permanent solution, and manually stirred counterclockwise for 60 seconds using a rod to form an improved second solution. Three batches of this improved second solution were prepared for the three subjects A, B and C.

[0036]

(2) The hair of the three subjects A, B and C was wound onto hair curlers according to conventional methods, next the improved first solutions prepared in (1)(i) were applied to the hair of the respective subjects, then the hair was wrapped in a sheet formed from a non-woven fabric (density 75 g/m²) consisting of polyester fibers (tourmaline content 1 mass%, Zeomic content 0.3 mass% with respect to polyester; fiber fineness 2 dtex) containing a tourmaline fine powder and a zeolite fine powder (Zeomic by Shinagawa Nenryō) ion-exchanged by silver ions and zinc ions, covered by a cap formed using the aforementioned non-woven fabric as the filling, and further covered by a commercially available plastic cap, then let stand for 5-7

minutes without covering the head with a heater (accelerator).

(3) Next, the curl condition of the hair of each subject was tested, and if in a good state of curl, then immediately after the test, or if the curling was insufficient, then after letting stand until a good state of curling was achieved, the aforementioned plastic cap, non-woven fabric cap and sheet were removed, and the improved second solution prepared in (1)(ii) was applied, the hair was again wrapped in the sheet used in (2), re-covered by the cap used in (2), and further re-covered by a commercially available plastic cap, then let stand for 5-7 minutes without covering the head with a heater (accelerator).

[0037]

(4) Then, the curling state of the hair was tested, and if in a good state of curl, then immediately after the test, or if the curling was insufficient, then after letting stand until a good state of curling was achieved, the aforementioned plastic cap, non-woven fabric cap and sheet were removed, and the hair washed and dried.

(5) The times for which the hair was let stand after applying the first solution and applying the second solution to the subjects A, B and C are shown in Table 2 below. Furthermore, upon evaluating the degree of effectiveness of the cold permanent and the hair quality of the subjects A, B and C after applying the cold permanent according to the evaluation criteria shown in the following Table 1, the results were as shown in Table 2 below. Additionally, upon evaluating the odor of the first solution and second solution of the improved cold permanent solution, the results were as shown in Table 2 below.

[0038]

<< Comparative Example 1 >>

(1) Cold permanents were applied to three subjects D (a 25 year old female), E (a 33 year old female) and F (a 45 year old female) by performing the same operations as in Example 2(2)-(4) using the cold permanent solution (New Yamano Cold of Mutsunami) used in Example 2(1) prior to the improvement treatment and a commercially available sheet and cap not containing a pyroelectric substance and metal ions. However, in Comparative Example 1, the treatment was performed with the heads of the subjects covered by a heater (accelerator) when letting stand after having applied the first solution and covered with the sheet and cap, and when letting stand after having applied the second solution and covered with the sheet and cap.

(2) The times for which the hair was let stand after applying the first solution and applying the second solution to the subjects D, E and F are shown in Table 2 below. Furthermore, upon evaluating the degree of effectiveness of the cold permanent and the hair quality of the subjects D, E and F after applying the cold permanent according to the evaluation criteria shown in the following Table 1, the results were as shown in Table 2 below. Additionally, upon evaluating the odor of the first solution and second solution of the improved cold permanent solution in accordance with the evaluation criteria shown in Table 1 below, the results were as shown in Table 2 below.

[0039]

TABLE 1

[Effectiveness of Cold Permanent]	
○	: Curls and waves well-formed, good.
△	: Curls and waves slightly loose, fair.
×	: Curls and waves inadequate, poor.
[Hair Quality After Cold Permanent]	
○	: Hair was glossy, firm and had volume.
△	: Hair had slightly inadequate gloss and/or firmness, hair quality fair.
×	: Hair had no gloss, was unruly, had no firmness, and lacked volume.
[Odor of Cold Permanent Solution]	
○	: Characteristic chemical odor of cold permanent solution reduced, little discomfort.
×	: Characteristic chemical odor of cold permanent solution strong, unpleasant odor.

[0040]

TABLE 2

	Example 2			Comp. Example 1		
	Subject			Subject		
	A	B	C	D	E	F
Time after applying first solution (minutes)	5	6	5	15	15	15
Time after applying second solution (minutes)	5	6	5	10	10	10
Effectiveness of cold permanent	○	○	○	×	△	○
Hair quality after cold permanent	○	○	○	×	×	△
Odor of cold permanent solution						
First solution	○			×		
Second solution	○			×		

[0041]

The above results from Table 2 show that in Example 2, by improving the cold permanent solution using the improving material of the present invention containing a pyroelectric substance and metal ions, and performing a cold permanent using the improved cold permanent solution, and further using a sheet (towel) and cap consisting of a non-woven fabric consisting of fibers containing a pyroelectric substance and metal ions, the treatment time was largely shortened, and the effectiveness of the permanent and the hair quality after the permanent were better for all of subjects A, B and C despite the fact that a heater (accelerator) was not used, as compared with the results for subjects D, E and F in Comparative Example 1 wherein a normal cold permanent solution was used without performing the improvement processes of the present invention, using conventional general-purpose sheets and caps, and using a heater (accelerator). Furthermore, the cold permanent solution of Example 2 obtained by improvement with an improving material containing a pyroelectric substance and metal ions had a reduced unpleasant odor.

[0042]

<< Example 3 >> Straight Permanent Treatment

(1) (i) 15 spheres (about 1 g) of the improving material produced in Example 1 were put into a dropper container containing 40 ml of a first solution (aqueous solution containing a reducing

agent) of a cold permanent solution (Zotosu Crystallizing Straight of Shiseido Beauty Company), and manually stirred counterclockwise for 60 seconds using a rod to form an improved first solution. Three batches of the improved first solution were prepared for use by three subjects G (a 24 year old female), H (a 39 year old female) and I (a 56 year old female).

(ii) 15 spheres (about 1 g) of the improving material produced in Example 1 were put into a dropper container containing 40 ml of a second solution (solution containing an oxidizing agent) of the aforementioned cold permanent solution, and manually stirred counterclockwise for 60 seconds using a rod to form an improved second solution. Three batches of this improved second solution were prepared for the three subjects G, H and I.

[0043]

(2) The improved first solutions prepared in (1)(i) were applied to the hair of the respective subjects G, H and I, then the hair was wrapped in a non-woven fabric sheet consisting of fibers containing a pyroelectric substance as used in Example 2, covered by a cap formed using the aforementioned non-woven fabric as the filling, and further covered by a commercially available plastic cap, then let stand for 5-7 minutes without covering the head with a heater (accelerator). Next, the softness of the hair was checked, and if at the desired softness, then immediately after the test, or if not at the desired softness, then after letting stand until the desired softness was achieved, the first solution was scraped from the hair with a comb, and ironed at about 160 °C.

(3) Next, the improved second solution prepared in (1)(ii) was applied to the hair of each subject, the hair was straightened using a comb, and in that condition, the hair was again wrapped in the non-woven fabric sheet consisting of fibers containing a pyroelectric substance as used in (2), let stand for 5-7 minutes without covering the head with a heater (accelerator), then the sheet was removed and the hair washed and dried.

(4) The times for which the hair was let stand after applying the first solution and applying the second solution to the subjects G, H and I are shown in Table 4 below. Furthermore, upon evaluating the straightness due to the cold permanent and the hair quality of the subjects G, H and I after applying the straight permanent according to the evaluation criteria shown in the following Table 3, the results were as shown in Table 4 below. Additionally, upon evaluating the odor of the first solution and second solution of the improved cold permanent solution in accordance with the evaluation criteria shown in Table 1 above, the results were as shown in Table 4 below.

[0044]

<< Comparative Example 2 >>

(1) Straight permanents were applied to three subjects J (a 29 year old female), K (a 42 year old female) and L (a 52 year old female) by performing the same operations as in Example 3(2) and (3), using the cold permanent solution (Zotosu Crystallizing Straight of Shiseido Beauty Company) used in Example 3(1) prior to the improvement treatment and a commercially available sheet and cap not containing a pyroelectric substance and metal ions. However, in Comparative Example 2, the treatment was performed with the heads of the subjects covered by a heater (accelerator) when letting stand after having applied the first solution and covered with the sheet and cap, and when letting stand after having applied the second solution and covered with the sheet and cap.

(2) The times for which the hair was let stand after applying the first solution and applying the second solution to the subjects J, K and L are shown in Table 4 below. Furthermore, upon evaluating the degree of effectiveness of the cold permanent and the hair quality of the subjects J, K and L after applying the cold permanent according to the evaluation criteria shown in the following Table 3, the results were as shown in Table 4 below. Additionally, upon evaluating the odor of the first solution and second solution of the improved cold permanent solution in accordance with the evaluation criteria shown in Table 1 above, the results were as shown in Table 4 below.

[0045]

TABLE 3

[Effectiveness of Straight Permanent]	
○	Hair straightened overall, treatment results good.
△	Some curls and/or waves remained, treatment results fair
×	Curls and/or waves remained at a high proportion, treatment results poor.
[Hair Quality After Cold Permanent]	
○	Hair was glossy, had good combability and was soft.
△	Hair had poor gloss and combability, hair quality fair.
×	Hair had no gloss, was unruly, and not combable.

[0046]

TABLE 4

	Example 3			Comp. Example 2		
	Subject			Subject		
	G	H	I	J	K	L
Time after applying first solution (minutes)	5	5	5	20	20	20
Time after applying second solution (minutes)	5	5	5	20	20	20
Effectiveness of straight permanent	○	○	○	△	×	△
Hair quality after straight permanent	○	○	○	×	×	△
Odor of cold permanent solution						
First solution	○			×		
Second solution	○			×		

[0047]

The above results from Table 4 show that in Example 3, by improving the cold permanent solution using the improving material of the present invention containing a pyroelectric substance and metal ions, and performing a straight permanent using the improved cold permanent solution, and further using a sheet (to vel) and cap consisting of a non-woven fabric consisting of fibers containing a pyroelectric substance and metal ions, the treatment time was largely shortened, and the straightness of the hair and the hair quality after the treatment were better for all of subjects G, H and I despite the fact that a heater (accelerator) was not used, as compared with the results for subjects J, K and L in Comparative Example 2 wherein a normal cold permanent solution was used without performing the improvement processes of the present invention, using conventional general-purpose sheets and caps, and using a heater (accelerator). Furthermore, the cold permanent solution of Example 3 obtained by improvement with an improving material containing a pyroelectric substance and metal ions had a reduced unpleasant odor.

[0048]

<< Example 4>> Hair Dye Treatment

(1) (i) 36 ml of a first solution (solution containing dye intermediary) and 72 ml of a second solution (solution containing coupler) of a hair dye (Beauty Lab Light Brown of Hoyu) were poured into a container, then 15 spheres (about 1 g) of the improving material produced in Example 1 were added, and manually stirred counterclockwise for 60 seconds using a rod to form an improved mixed solution. Three batches of the improved mixed solution were prepared for use by three subjects M (a 26 year old female), N (a 32 year old female) and O (a 38 year old female).

(2) After applying the improved mixed solution obtained in (1) to the hair of subjects M, N and O in accordance with conventional methods, the hair was wrapped in a non-woven sheet consisting of fibers containing pyroelectric substances and metal ions like that used in Example 2, covered by a cap formed using the non-woven fabric consisting of fibers containing pyroelectric substances and metal ions like that used in Example 2 as the filling, and further covered by a commercially available plastic cap, then let stand for 3-5 minutes without covering the head with a heater (accelerator), after which the hair color was checked, and after combing through the hair, the hair was again wrapped in the aforementioned sheet, let stand for 2-5 minutes without covering the head with a heater (accelerator), then the sheet was removed and the hair washed and dried.

[0049]

The times for which the hair was let stand after applying the improved mixed solution and after combing through the hair in the subjects M, N and O are shown in Table 6 below. Furthermore, upon evaluating the condition of the hair dye and the hair quality of the subjects M, N and O after performing the hair dye according to the evaluation criteria shown in the following Table 5, the results were as shown in Table 6 below. Additionally, upon evaluating the odor of the improved hair dye solution (mixed solution) and ease of removal of the mixed solution after adhering to the skin in accordance with the evaluation criteria shown in Table 5 below, the results were as shown in Table 6 below.

[0050]

<< Comparative Example 3>>

(1) The first solution and second solution of the hair dye solution without having undergone the improvement treatment used in Example 4(1), were mixed together, and without performing an improvement treatment by the improving material of the present invention, the mixed solution was applied to three subjects P (a 30 year old female), Q (a 35 year old female) and R (a 39 year old female), to perform hair dyeing by performing the same operations as in Example 4(2)-(3) using a commercially available sheet and cap not containing a pyroelectric substance and metal ions. However, in this Comparative Example 3, the treatments were performed by covering the subject's head with a heater (accelerator) both times the hair is let stand after applying the mixed solution.

(2) The times the hair was let stand after applying the non-improved mixed solution and after combing through in subjects P, Q and R are as shown in Table 6 below. Additionally, upon evaluating the hair dyeing condition and the hair quality after dyeing in subjects P, Q and R in

accordance with the evaluation criteria shown in Table 5 below, they were as shown in Table 6 below. Additionally, upon evaluating the odor of the hair dye solution (mixed solution) not subjected to the improvement treatment and ease of removal of the mixed solution after adhering to the skin in accordance with the evaluation criteria shown in Table 5 below, the results were as shown in Table 6 below.

[0051]

TABLE 5

[Hair Dye Condition]	
○	: Hair well-dyed to desired tone overall, hair dye condition good.
△	: Some areas where hair dye inadequate, hair dye condition fair.
×	: Hair not adequately dyed overall, large dye spots, hair dye condition poor.
[Hair Quality After Hair Dye]	
○	: Hair was glossy, had good combability and quality.
△	: Hair had poor gloss and combability, fair hair quality.
×	: Hair had no gloss, was unruly, had no firmness, and was uncombable
[Odor of Hair Dye Solution]	
○	: Characteristic chemical odor of hair dye solution reduced, little discomfort.
×	: Characteristic chemical odor of hair dye solution strong, unpleasant odor.

[0052]

TABLE 6

	Example 4			Comp. Example 3		
	Subject			Subject		
	L	M	N	O	P	Q
Time after applying mixed solution (minutes)	5	5	5	15	15	15
Hair dye condition	○	○	○	×	×	△
Hair quality after dyeing hair	○	○	○	×	×	×
Odor of hair dye solution	○			×		

[0053]

The above results from Table 6 show that in the case of Example 4, by improving the hair dye solution using the improving material of the present invention containing a pyroelectric substance and metal ions, and dyeing hair using said improved hair dye solution (mixed solution), and further using a sheet (towel) and cap consisting of a non-woven fabric composed of fibers containing a pyroelectric substance and metal ions, the treatment time was largely shortened, the hair dye condition was good, and the hair quality after the treatment was good for all of the subjects M, N and O despite not having used a heater (accelerator), as compared with the subjects P, Q and R of Comparative Example 3 using a normal hair dye solution not treated by the improvement process of the present invention, using conventional general-purpose sheets and caps, and using a heater (accelerator).

[0054]

EFFECTS OF THE INVENTION

By using a pyroelectric substance, or a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt, or contacting chemical solutions for cosmetic treatment of hair using material containing these, it is possible to improve these chemical solutions for cosmetic treatment. The improvement technique of the present invention can be applied to various commercially available chemical solutions for the cosmetic treatment of hair, and can improve the quality of conventional commercially available chemical solutions for cosmetic treatment. When cosmetic treatments such as cold permanents, straight permanents, hair dyeing and hair bleaching are performed using the improved chemical solutions for cosmetic treatments according to the present invention, the cosmetic treatments of the hair can be performed smoothly and in a shorter time than in the past without using expensive heaters (accelerators). Therefore, the load and wear on those performing the treatments and those receiving the treatments can be reduced, expensive accelerators (such as hair heaters) are not needed to accelerate hair curling or waving, straight permanents, or hair dyeing, and furthermore, the turnover at beauty salons is improved, thus raising the business record and reducing equipment costs.

[0055]

Upon having performed the various treatments using the chemical solutions for cosmetic treatment improved by the present invention, the hair can be left in a good, firm condition after the treatment. The chemical solutions for cosmetic treatment improved by the present invention have reduced irritation to the skin, are less likely to cause skin problems, and in the case of hair dye solutions, are easily removed when adhering to the skin, excelling in safety and sanitation. When using a chemical solution for cosmetic treatment such as a cold permanent solution or hair dye solution improved by the present invention, a cold permanent, straight permanent and hair dye can be satisfactorily applied even to highly damaged, straw-form hair. Conventionally, the great stresses placed on hair by permanent treatments such as cold permanents and straight permanents and hair dyes have made it difficult to perform these simultaneously, but since the cold permanent solution and hair dye solution improved by the present invention place little stress on the hair, it is possible to perform permanents and hair dyeing simultaneously. Since the chemical solution for cosmetic treatment of hair improved by the present invention has a reduced unpleasant odor, it is also possible to improve the treatment environment.

[0056]

By using the fiber products (towels, sheets, caps etc.) for cosmetic treatment of hair of the present invention formed of a fiber fabric containing or having adhered thereto a pyroelectric substance, or a pyroelectric substance and at least one metal ion chosen from among silver, zinc, copper, gold, platinum, iron, nickel and cobalt, it is possible to perform various cosmetic treatments such as cold permanents, straight permanents, hair dyeing and hair bleaching smoothly in a short time, leaving the hair in a good, firm condition after the treatment, reducing skin problems due to the chemical solution, allowing a permanent and a hair dye to be performed simultaneously, and allowing a permanent and hair dye to be satisfactorily performed even on highly-damaged, straw-form hair.

BRIEF DESCRIPTION OF THE DRAWING::

FIG. 1 A drawing showing an example of the improving material for a chemical solution for cosmetic treatment according to the present invention, and an example where the improving material is placed inside the chemical solution for cosmetic treatment.

FIG. 2 A drawing showing an example of an improving tool having the improving material for a chemical solution for cosmetic treatment according to the present invention housed inside a liquid-permeable cage, and an example where the improving tool is placed inside the chemical solution for cosmetic treatment.

FIG. 3 A drawing showing an example where the improving material of the present invention is placed inside a liquid-permeable cage, and a rod is attached to form a stirrer, and an example where the tool is used to stir a chemical solution for cosmetic treatment.

EXPLANATION OF REFERENCE NUMBERS

- | | |
|---|---|
| 1 | improving material for chemical solution for cosmetic treatment |
| 2 | chemical solution for cosmetic treatment |
| 3 | cage |
| 4 | container |
| 5 | rod |
| 6 | stirrer |

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